OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

SAMPLING, ANALYSIS AND QUALITY ASSURANCE PLAN FOR CENTRAL STEEL DRUM SITE NEWARK, NEW JERSEY

Prepared for:

U.S. Environmental Protection Agency
Region II
Edison, New Jersey

Prepared by:

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OHM Project 20163

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1.0 INTRODUCTION

This Sampling, Analysis and Quality Assurance Plan (SAQAP) has been prepared to guide the sampling and analytical tasks necessary for the sampling, field classification, analysis and documentation needed to complete the removal of certain containerized wastes present at the Central Steel Drum Site, 704-738 Doremus Avenue, Newark, New Jersey. This work is being conducted for the U.S. Environmental Protection Agency, Region II.

A total of approximately 50,000 gallons of hazardous wastes are estimated to have abandoned throughout the building/site, of which approximately 35 % are believed to be solid wastes.

This document is comprised of two distinct discussions. Sections 2.0 through 5.0 are devoted to on-site personnel organization, sampling procedures, and documentation required to assure that representative and accurate preliminary classification of the materials is occurring. Sections 6.0 through 9.0 present the analytical methods and the quality assurance and quality control (QA/QC) procedures to be used, including sample management and custody, and off-site laboratory QA/QC methods which assure the project data ultimately generated is accurate and legally defensible according to appropriate State and Federal requirements.

All field sampling, documentation, field analysis and sample management for this project will be conducted by OHM's field analytical group based in Trenton, New Jersey. In preparing this Sampling and Analysis Plan (SAP), OHM has utilized the following documents:

Action Memorandum, U.S.E.P.A, Region II, CERCLA ID No. NJD011482577

U.S.E.P.A. August 1987-Compendium of Field Operations Methods Oswer No. 9335.0-14

U.S.E.P.A.-Sampling for Hazardous Materials

U.S.E.P.A. May 1989-RCRA Facility Investigation Guidance

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

2.1 DATA ACQUISITION ACTIVITIES

Data acquisition activities for the project will be accomplished using personnel from both OHM and the subcontracted analytical laboratories.

For this project, OHM personnel will be responsible for the following activities:

- Development and/or revisions to all project submittals and plans.
- Collection, documentation, and off-site shipment of all site samples.
- Maintaining project communication with the subcontract laboratory.
- Review and/or validation of all subcontract generated data.

A discussion of OHM personnel titles and duties is presented in the subsection below.

2.2 PROJECT PERSONNEL WITH SAMPLING/ANALYSIS RESPONSIBILITIES

Project personnel with sampling and analytical responsibilities include:

- Response Manager - Mr. Stan Gable will serve as the Response Manager for this project. He is responsible for all financial, safety and quality concerns on the job. He will maintain project status interactions with the Group as needed.

- Senior Project Chemist - Mr. Ronald Kenyon, Regional Technical Manager, will serve as Senior Project Chemist for the project. He is responsible for oversight of all facets of analytical data generation, including oversight of field sampling personnel, analytical laboratory procurement, analytical data review and communication with the laboratory.

- Project Chemist - The on-site project chemist is responsible for direct oversight of the field sampling crews, on-site field characterization (HAZCAT) of materials, management of the site database system, and interaction with the subcontract analytical laboratory.

- Senior Technician - The senior technicians implement all field sampling according to the Sampling Plan and complete all field documentation, ensuring all corporate, contract and project procedures are followed. The senior technician is also responsible for sample management and transportation to the off-site analytical laboratory.

3.0 SAMPLING AND ANALYSIS OBJECTIVES

The following sections present an overview of the sampling, documentation, field characterization, and laboratory analysis tasks required for a timely removal and proper off site disposal of Group drums from the Site. Detailed discussion regarding the execution of the objectives presented here can be found in the appropriate subsequent sections.

3.1 WASTEPILES

Numerous piles and areas containing incinerator ash, slag or shot blasting compound ("black beauty") exist about the site. These piles will be composited for disposal analysis as shown in Figure 6-1. Like wastes will be composited based on visual determination.

3.2 DRUMS

It is estimated that approximately 500 drums containing flammable, corrosive, possible water reactive, incinerator ash and sand blasting materials have been abandoned on the Site. Containers which are intact and unopened containers of unused or off-spec product which have intact manufacturer's labels or similar markings identifying the contents of the drum will be opened at a representative frequency and a visual check of the contents will be made. A Drum Log will be generated for each individual container, but no additional field testing or laboratory analysis is anticipated for these drums.

Drums containing illegible markings, no markings, or that appear to have been refilled will be assumed to contain unknown materials. These drums will be accessed for sampling after all safety concerns have been addressed such as pressurization or visual observation of crystallization as discussed in section 4.0. Each drum will be documented on an OHM Drum Log and receive a limited on site field characterization (HAZCAT).

3.3 FIELD CHARACTERIZATION

To the extent the drum is an orphan drum, the characterization will be limited to that which is necessary for site segregation and stabilization. The results of the field analysis are recorded onto the Drum Log and entered into the site database. Ultimately containers of like chemical and physical characteristics are sorted together and assigned a proper hazard class (i.e. flammable liquid, oxidizing solid) to guide future material management on site until disposal. A complete discussion of the HAZCAT procedures is presented in section 6.0.

3.4 LABORATORY ANALYSIS

Samples from all unknown materials identified as group drums requiring additional analysis for accurate disposal characterization will be shipped to the off site subcontract laboratory as required. The lab will be competitively procured once and approximate number of samples requiring analysis has been determined by the project chemist. The selected lab will perform all analyses according to accepted EPA methods and will maintain a current NJDEP certification.

4.0 FIELD SAMPLING PROCEDURES

4.1 SAMPLING PROCEDURES

All field sampling procedures to be employed by the field sampling teams are techniques readily accepted by both the USEPA and NJDEP and based on OHM's internal Standard Operating Procedures (SOPs) and this SAQAP which will be present on site during all sampling activities. Details of these procedures are presented below.

4.2 CONTAINERIZED MATERIAL SAMPLING

Sampling of containerized materials will occur only after the container has been evaluated from a health and safety perspective. Containers which appear bulged or under pressure will be remotely opened. Any previous records, container content labels or manufacturer's labels will be consulted before opening any container.

4.2.1 Liquid Materials

Liquids in a container will be sampled using 4-foot sections of glass tubing or pipette (12 to 18 mm ID). The pipette is slowly lowered into the drum. When the bottom of the drum is reached, the sampler places a thumb over the end of the pipette and retrieves it. Any liquid or sludge layering in the container should now be apparent as the tube is brought up. The contents of the tube are then released into a 16-ounce sample bottle. The process is repeated until sufficient sample has been collected. Sludge or solids underneath a liquid may be sampled by forcing the pipette into it. If the sludge does not run out into the jar, shaking the pipette or tapping it against the side of the bottle may loosen the sample. If this fails, one may break the pipette and put the pieces containing the solid in the bottle.

4.2.2 Solid and Semi-Solid Materials

Solids in a container will be sampled with a single use disposable inert sample scoop. The sample will then be transferred to a pre-cleaned clear glass 16-ounce wide mouth sample container. If the material must be broken up prior to sampling, a brass hammer and chisel will be used. If the material is too elastic, a piece will be cut off with a razor knife. Reusable sampling tools used will be decontaminated between drums, as listed in Section 4.4.

4.3 RINSEWATERS/DECONTAMINATION WATERS

Containerized rinse waters generated during site activities will be sampled at the appropriate times during the project. Depending upon physical characteristics of rinse waters and the available sampling mechanics of the tanks, one of the following sampling methods will be employed when sampling rinse waters:

- Grab sampling directly from a valve or sample port on the holding tank
- Use of a stainless steel bacon bomb sampler
- Use of a chemically-inert, bottom-filling bailer

4.4 SMALL QUANTITY CONTAINERS

Small quantity containerized materials are typically sampled by pouring directly from the container or by obtaining a sample aliquot for testing using a transfer pipette. These materials are testing for their general lab packing classification and are not compromised.

4.5 DECONTAMINATION PROCEDURES

All non-disposable sampling equipment (augers, stainless steel trowels) will be decontaminated prior to, and between, sampling events by the following procedure:

- Detergent/tap water wash
- Distilled/de-ionized (DI) water rinse
- 10% nitric acid rinse
- DI water rinse
- Acetone rinse
- Air dry

Use of these procedures will ensure that material transfer between sampling points is minimized; that is, cross-contamination will not occur. This will be verified by the use of equipment rinsate samples.

4.6 SAMPLE CONTAINERS

The following table presents the sample container and preservation requirements anticipated for the project.

TABLE 4.1
CONTAINER AND PRESERVATIVE REQUIREMENTS

Analytes	Matrix	Sample Container	Preservatives
TCL Volatiles	Water	40 ml glass vials with Teflon-faced silicon septa and hole-top cap	4 deg. C 1:1 HCl to pH<2 0.008% $Na_2S_2O_3$ if residual Cl
TCL Semivolatiles	Water	1,000 ml amber glass	4 deg. C
TCL Pesticides/PCBs	Water	1,000 ml amber glass	4 deg. C
TAL Metals Mercury Cyanide	Water	1,000 ml polyethylene 500 ml glass	4 deg. C, HNO_3 to pH<2 4 deg. C, NaOH to pH>12
TCLP/Total Volatiles	Solid	500 ml VOA, no headspace	4 deg. C
TCLP/Total Semivolatiles	Solid	1000 ml glass	4 deg. C
TCLP/Total Metals	Solid	1000 ml glass	4 deg. C
Dioxin	Solid	1000 ml glass	4 deg. C

5.0 DOCUMENTATION

All inventory of known drums and sampling of unknown drums will be documented on the OHM Drum Log and entered into a project-specific database.

5.1 FIELD SAMPLING DOCUMENTATION

Each sampling team will enter the required documentation into the OHM Drum Log as presented in Figure 5-1. All applicable label and visual observation information will be added to the Drum Log for this project, as well as client names, client contacts, and product names.

5.2 FIELD CHEMISTRY DOCUMENTATION

Once the Project Chemist has completed a field HAZCAT analysis for a Group drum, the results are entered into the compatibility section of the Drum Log as shown in Figure 5-1. From here, the drums will be sorted into similar hazard classes or "bulk groups" based on the physical and chemical attributes. The chemist will then utilize the Material Blending Log, Figure 5-2, to complete and document a bench scale test blending of the materials. If successful, this same scenario will be used by the operations crew to actually bulk together the drum quantities for off-site disposal.

FIGURE 5-1

DRUM INVENTORY LOG

OHM Remediation Services Corporation	DRUM INVENTORY LOG	Drum No : D000003 Project Number : 20100

Project Location : Morgan Materials — Logger : Mr. Observant — Date: 3/25/96

Project Contact : Rick Wolfson — Sampler : D. Stick — Time : 14:28:37

Phone : 800-537-9540 — Weather : Overcast 70

Drum Type: ☐ Fiber ☒ Poly-Lined ☐ Steel ☐ Poly ☐ Stainless Steel ☐ Nickel

Lid Type: ☐ Ringtop ☒ Closed Top

Drum Condition: ☐ Meet DOT Spec. ☐ Good ☒ Fair ☐ Poor

Drum Size: ☐ 110 ☐ 85 ☒ 55 ☐ 42 ☐ 30 ☐ 16 ☐ 10 ☐ 5 Other Size : 55.00

Drum Contents: ☐ Full ☒ 3/4 ☐ 1/2 ☐ 1/4 ☐ < 1/4 ☐ Empty

Over Packed ☐ Yes ☒ No OverPack Type: ☐ Fiber ☐ Steel ☐ Poly OverPack Size: ☐ 110 ☐ 95 ☐ 90 ☐ 85 ☐ 55

LAYER	PHYS. STATE	COLOR	CLARITY	LAYER THICKNESS
BOTTOM	Liquid	Colorless	Clear	8.00
TOP	Liquid	Brown	Opaque	18.00

FIELD ANALYSIS

pH : PID : ppm

Dosimeter : Other :

DRUMS LABELS/MARKINGS

DOT HAZ :None UN/NA :None

MFG Name : None

Chemical Name : None

Additional Information : None

DRUM COMPATABILITY DATA

☒ OK MARK IF THE PHYSICAL STATE AND COLOR MATCHES THE ABOVE INFORMATION. IF NOT, STOP ANALYSIS AND NOTIFY PROJECT CONTACT. FURTHER WORK WILL NOT BE PAID FOR.

DRUM CAT : OrgLiq.OxAqLiq.

ANALYSTS : Joe Chemist

DATE PERFORMED : 3/25/96

LAYER	PHYS. STATE	COLOR	CLAR	W. SOL	DEN SITY	REACT	pH	HEX. SOL	PER	OXID	CN	SUL	BLSTN	FP	PCBs	LAYER CLASS
BOTTOM	Liquid	Colorless	Clear	S		-	7.00	I	-	+	-	-	-	-	-	OxAqLiq
TOP	Liquid	Brown	Opaque	I	L	-	7.00	S	-	-	-	-	-	-	-	OrgLiq

COMMENTS :

PCB CONC. : FLASH PT. : COMPAT. COMP.BULK# : BG04 BULKED IN :

DATA REVIEWER : DATA REVIEW DATE :

FIELD REVIEWER : FIELD REVIEW DATE :

TRANSFER NUMBER	TRANSFERS RELINQUISHED BY	TRANSFER ACCEPTED BY	DATE	TIME
1				

FIGURE 5-2

COMPOSITE BLENDING TEST LOG

a222

OHM REMEDIATION SERVICES CORP.

SAMPLE COMPOSITE BLENDING TEST LOG

1 of 1 Pages

WASTE STREAM NUMBER : BG03 — WASTE STREAM : OrgLiq.

PROJECT NUMBER :20100 — PROJECT NAME :Morgan Materials

PROJECT CHEMIST : Joe Chemist, Sr. — SUPERVISOR : JD Bottle

DATE BLENDING TEST PERFORMED :_____ — BLENDER : P. Lucky

SEQ. NO.	Drum No	DRUM CAT	TEMPERATURE RISE DEGREE C	GAS EVOLVED YES	GAS EVOLVED NO	HAZARDOUS REACTION YES	HAZARDOUS REACTION NO	APPROVED TO BLEND
1.00	D000002	OrgLiq.		☐	☐	☐	☐	
2.00	D000004	OrgLiq.		☐	☐	☐	☐	
3.00	D000007	OrgLiq.		☐	☐	☐	☐	
4.00	D000009	OrgLiq.		☐	☐	☐	☐	

TO THE BEST OF MY KNOWLEDGE THE INFORMATION GIVEN ON THIS FORM IS CORRECT AND ERROR FREE EXCEPT WHERE NOTED IN THE COMMENTS SECTION.

SIGNATURE (PROJECT CHEMIST)_____ DATE:_____

6.0 ANALYTICAL PROCEDURES

This section represents the details of the analytical methods that will be employed on-site by the project chemist as well as the anticipated off-site laboratory analyses required for complete disposal characterization under RCRA and DOT regulations.

6.1 FIELD HAZARD- CHARACTERIZATION (HAZ CAT) ANALYSIS

Subsequent to the collection of discreet samples form each unknown container, field haz-cat analysis for the initial waste hazards will occur, followed by a bench scale bulking exercise for Group drums containing chemically similar materials. Following is an overview of OHM's compatibility procedures.

OHM will perform haz-cat analysis on each layer of every sample obtained. Haz-cat analysis will be performed for Group drums to separate and classify the material into compatible groups.

Following is an overview of the field analysis procedures OHM will employ for preliminary hazard identification of the unknown materials and the site segregation and stabilization of orphan drums.

Water solubility The solubility of the sample in water is determined by adding 1-ml distilled/de-ionized (DI) water to a1-gram sample, in a 12-mm x 100-mm culture tube. The contents are stirred using a vortex mixer.

- The results are recorded as positive (water soluble), partially soluble, slightly soluble, or negative (water soluble).

pH The pH of the aqueous layer is determined using Baxter (or similar manufacturer) pH test strips.

- The color change on the strip is compared to a color-chart supplied by Baxter.
- The pH is determined to an accuracy of +/- one pH unit.
- Samples with a pH less than 4 are classified as acidic.
- Samples with a pH greater than 10 are classified as basic.

Hexane solubility The solubility of the sample in hexane/dichloromethane (50/50) is determined in an analogous method as described for water solubility. The hexane/DCM is prepared prior to the initiation of hazcatting.

- The sample is classified as organic with just the slightest solubility in hexane/DCM. This is to avoid organic material from containing an aqueous wastestream.

Flash point is determined for samples by the use of seta-flash apparatus or qualitative method.

- The apparatus is calibrated to determine those samples which have a flash point less than or equal to 60 C° (140°F).
- Samples which are positive are classified as flammable.

Chlorinated compounds are determined by the use of a flame test. Sample is placed within a loop of sterilized copper wire, and immersed into a flame.

- A green flame is positive for chlorine.
- A blue flame is indicative of bromine.

Peroxide The organic layer is tested for peroxides by placing a few drops of the organic layer on a peroxide test strip (commercially available from EMQuant).

- A drop of water is then added to the strip after 30 seconds.
- A color change to blue is an indicator of peroxide.

- The concentration of peroxide can be quantitated by comparison of the blue color to a color scale which accompanies the test strips.

Oxidizing material The presence of an oxidizer is determined by the following tests.

- Acidifying a strip of potassium iodide-starch test paper (commercially available from EM Quant) with a glacial acetic acid.
- Then a few drops of the sample are placed on a potassium iodide-starch test paper strip.
- A dark blue-black color formed within a few seconds is indicative of a strong oxidizer.
- A light-blue color, or color formation which requires up to 5-minutes, is indicative of a weak oxidizer.

Sulfide material The presence of sulfides in a sample is determined using a buffered lead acetate test strip.

- A few drops of 2M sodium acetate buffer solution (pH5) is added to the test strip prior to the sample.
- A dark-brown color, formed within a few seconds (lead sulfide) is a positive test for sulfides.
- Confirmation of sulfides can be made with a cadmium carbonate solution. A yellow precipitate (cadmium sulfide) is a positive result.

Cyanide material The presence of cyanide in a sample is detected by the use of commercially available cyanide test kits (EM Quant).

- 1-gram of sample is diluted to 5-ml with DI water.
- The pH is adjusted to 7-8 by the addition of a measured quantity of phosphate buffer. Dissolution of the buffer is enhanced by stirring on a Vortex mixer.
- 5-drops of pyridine-barbituric acid is added.
- A test strip is immediately immersed into the solution for 30-seconds.
- A positive test for cyanides is indicated by a color change to red on the test strip reaction zone.
- The concentration of cyanide can be approximated upon comparison of the color of the reaction zone to color chart which accompanies the test strip kit.

6.2 BENCHSCALE MATERIAL BLENDING

Following characterization of the samples from the drums, a benchscale bulking test of chemically like samples will be conducted. The samples are bulk tested by slowly adding a small proportional aliquot from each sample in the same classification group. Samples from the same compatible group will be bulked in not more than 25 samples per "bulk sample". This bulked composite sample from compatible samples will be submitted for disposal analysis. A five minute waiting period follows each addition, during which the

bulked samples are monitored for any gas evolution or exothermic reaction. If a reaction occurs, the bulking test is repeated without the addition of the reactive sample. Upon completion of the benchscale bulk test, the compatible groups are identified. The blending procedure is documented by the chemist using the form presented in Figure 5-2.

By performing compatibility analysis and benchscale bulking tests, OHM reduces the amount of samples that require disposal analysis. This significantly lowers costs while providing an effective means of identifying Group drums for disposal. These tests also provide information for performing on site bulking of Group drums for disposal if this method is found to be more cost-effective than individual drum disposal.

6.3 MATERIAL DISPOSAL ANALYSIS

The data received from the compatibility analysis will be reviewed by OHM's treatability and disposal manager who will, with individual members of the Group, determine the most suitable disposal analysis to be performed. This determination will be based on the most cost-effective and feasible method of disposal for Group drums. Table 6-1 presents the standard lab analyses OHM utilizes for materials based on the proposed disposal option.

All samples are prepared and analyzed according to SW-846 methods, where available. If no SW-846 methods may be applied, another EPA-approved method will be used. If no EPA methods are available, a suitable ASTM or APHA method will be used.

TABLE 6.1
OHM - GUIDELINES FOR DISPOSAL ANALYSES

PACKAGE A [ALL SAMPLES]	
Analysis	**Method(s)**
Total Solids	160.3
Corrosivity, pH	150.1, 9040, 9045
Flash Pt. Ignitability	1010, 1020
Reactive Sulfide	Sec. 7.3.4.1
Reactive Cyanide	Sec 7.3.3.2
TCLP Volatile Organics	1311 - 8240, 8260
TCLP Semi-Volatile Organics	1311 - 8270
TCLP Metals	1311 - 6010, 7000's
TCLP Pesticide/Herbicides	1311 - 8080/8150
TCL Volatile Organics	8240, 8260
TCL Semi-Volatile Organics	8270
TCL Pesticide/PCBs	8080
TCL Herbicides	8150
PACKAGE B [INCINERATION DISPOSAL] Package A plus the following:	
% Ash	160.4
BTU	ASTM
Total Halides	9020
Total Sulfur	ASTM
Total Cyanide	9010
TAL Metals and Molybdenum	6010, 7000's
PACKAGE C [LANDFILL DISPOSAL] Package A plus the following:	
Paint Filter Test	9095
Total Cyanide	9010
Total Organic Halogens (TOX)	9020
PACKAGE D [WASTEWATER TREATMENT] Package A plus the following:	
Total Sulfide	3762, 9030
Total Cyanide	9010
Total Phenols	420.1, 9065
TAL Metals and Molybdenum	6010, 7000's

7.0 SAMPLE CUSTODY AND SHIPMENT

Documentation of sample custody following collection is accomplished using a standard Chain-of-Custody Record. This document traces possession of every sample from the time of collection through sample analysis.

In general, chain of custody protocols follow those outlined in USEPA guidelines. This documentation begins immediately following sample collection and proper labeling. The chain-of-custody record provides information on the sealing of samples, the sample number, sample description, date and time of collection, number of containers for the sample, type of analysis requested, and any pertinent remarks are entered onto the chain of custody record form, an example of which is shown in Figure 6.1. The chain-of-custody record form also documents the condition of sample containers upon their receipt from the support laboratory. This form is completed using indelible black ink.

7.1 INSTRUCTIONS FOR COMPLETING CHAINOF-CUSTODY RECORD

1. Project Name - None assigned by USEPA Central Steel Drum site
2. Project Location - City and state in which the project is located; 704-738 Doremus Ave., Newark, New Jersey
3. Project Number - Number assigned by OHM (20136)
4. Project Contact - TBD
5. Project Telephone Number - Telephone number of OHM onsite office trailer
6. Client Representative - Greg DeAngelis is the EPA representatives
7. Project Manager/Supervisor - Howard Perlmutter is OHM's Deputy Program Manager
8. Sample Number - Number assigned in the field during collection of samples.
9. Date - Date of sample collection.
10. Time - Time of sample collection (24-hour time).
11. Composite/Grab - Checkmark the appropriate column to indicate whether sample is composite or grab.
12. Sample Description (Include Matrix and Point of Sample) - Indicate whether sample is soil, liquid, air, oil, etc., along with any useful description, such as appearance (color, density, odor, etc.) Includes the location, designation, such as monitoring well number, soil sample coordinates, or EPA description number. This information must be the same as the sample label information.
13. Number of Containers - Number, size (volume), and types of containers that are sealed and labeled for transfer to another location.

14. Analysis Desired (Indicate Separate Containers) - The name of the test (i.e., PCBs) or series of tests (VOAs) with method numbers is to be entered on the diagonal lines. For each sample container designated in the number of containers, a checkmark (√) should appear in the column for the desired analysis.

15. Remarks - Enter sample specific instructions, cautions, or priorities (i.e., "do cyanide test first on this sample" or "caution may contain hydrofluoric acid;" also indicate preservation of sample (i.e., "sulfuric acid added"). Enter a sample specific comment (i.e., "sample lost in shipping").

16. Item Number - Each sample number is considered a separate item. Use sequential number (1,2,3...). Item numbers begin with No. 1 on each form. Do not carry item numbers from one form to another. List items 1,2,3... that you accepted.

17. Transfers Relinquished By - Name of person and affiliation transferring or surrendering the sample to another person, (do not use only the name of an organization).

18. Transfers/Accepted By - Person signing this part is responsible for the sample(s). In addition to the person's name, he should include his company name or agency(s) initial. Person accepting sample(s) is also responsible for making sure that all samples are accounted for when he signs an acceptance. If a common carrier is used, include the carrier name and bilbf-lading number or airbill number.

19. Date - Date on which sample is released to next person.

20. Time - Time at which sample is released to next person.

21. Remarks - Enter general instruction or requests, such as, fax report and turnaround times requested, preservatives added.

22. Sampler's Signature - The signature of the individual performing, or having immediate oversight of the sampling should appear in this section.

23. Laboratory name, telephone number, and contact.

7.2 FIELD CUSTODY PROCEDURES

In collecting samples for evidence, collect only that number which provides a fair representation of the media being sampled. To the extent possible, the quantities and types of samples and sample locations are determined prior to the actual field work. Minimization of sample transfers is always considered.

The field sampler is personally responsible for the care and custody of the samples collected until they are transferred or properly dispatched.

Sample labels shall be completed for each sample using indelible ink unless prohibited by weather conditions.

Throughout the course and at the end of the field work, the project chemist/scientist determines whether these procedures have been followed and whether additional samples are required.

Custody Seals will be placed over the cap of each sample container and the lids of shipping containers prior to the samples and containers leaving the custody of the shipping personnel. The Custody Seals will be preprinted adhesive-backed labels with perforations designed to break if the containers are opened.

7.3 TRANSFER OF CUSTODY AND SHIPMENT

Samples are accompanied by a COC record. When transferring the possession of samples, the individuals relinquishing and receiving sign, date, and note the time on the record. The person receiving the samples should always inspect for correct sample description and sample count. This record documents transfer of custody of samples from the sampler to another person, a mobile laboratory, or an analytical laboratory. The original record will accompany the shipment, and a copy will be retained in the project files.

Samples will be properly packaged in accordance with DOT regulations for shipment and dispatched to the selected laboratory for analysis with a separate custody record prepared for each laboratory. COC records will be placed in a gallon Ziploc™ bag and taped inside the cooler lid. All glass sample containers will be placed in Ziploc™-type bags for shipment. Also, Ziploc™-type bags will be filled with ice and placed between and around the samples in the cooler. Sufficient ice will be used to maintain sample temperature at $4° C \pm 2° C$.

Airbills from the courier will be retained as part of the permanent documentation. The person relinquishing the sample signs off his custody and enters the courier company's name and the bill-of-lading number or airbill number.

When samples are split with the facility or another government agency, a separate custody record is labeled to indicate this. In addition, the sample numbers from all the labels are recorded on the custody record. The person relinquishing the samples to the facility or agency should request the signature of a representative of the appropriate party, acknowledging receipt of the samples. If a representative is unavailable or refuses to sign, this is noted in the "received by" space. When appropriate (i.e., the representative is unavailable), the COC should contain a statement that the samples were delivered to the designation location at the designated time. The copy of the COC record may be given to the facility or agency upon request.

7.4 LABORATORY CUSTODY PROCEDURES

Once the sample arrives at the laboratory, custodial responsibility of the sample is transferred to that facility. The minimum requirements for a laboratory custodial system are:

- Designation of a sample custodian whose duties include:
  - Receiving samples
  - Initiating paperwork within the laboratory
  - Inspecting and documenting sample conditions, e.g. temperature, pH, leakage, breakage, seals
  - Verifying and recording agreement of information on the sample documents
  - Marking/labeling of samples for laboratory use
  - Distributing samples to appropriate analysts
  - Placing samples and extracts into the appropriate storage and/or secure areas
  - Controlling access to samples and extracts
  - Monitoring storage conditions for proper temperature and prevention of cross-contamination
  - Proper disposal of samples and extracts

- Secure appropriate storage for samples and extracts
- Sample tracking system
- Controlled access to storage areas
- Monitoring procedures for storage areas

LAB COPY

OHM Corporation

CHAIN-OF-CUSTODY RECORD

Form 0019
Field Technical Services
Rev. 08/89

136200

O.H. MATERIALS CORP. • P.O. BOX 551 • FINDLAY, OH 45839-0551 • 419-423-3526

PROJECT NAME		PROJECT LOCATION
PROJ. NO.	PROJECT CONTACT	PROJECT TELEPHONE NO.
CLIENT'S REPRESENTATIVE		PROJECT MANAGER/SUPERVISOR

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS)	REMARKS
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME	REMARKS
1						
2						
3						
4						SAMPLER'S SIGNATURE

FIGURE 7.1

8.0 DATA REPORTING AND VALIDATION

8.1 DATA REDUCTION AND TABULATION

Data generated from the site activities can be grouped into two broad categories:

- Field data, such as data collected during VOC screening; and
- Chemical data for environmental samples generated by the project laboratory and accompanying QA/QC data package deliverables as required for DQO Level II and Level III.

These data will be compiled and managed using a central project filing system. The field and laboratory data filing system will be a manual storage system established at the OHM's field office at the Site. Field and laboratory data will be filed chronologically. Field log books, sample logs, sample data sheets, chain-of-custody records, laboratory log books, and laboratory calculation sheets shall be labeled with a task number and date.

8.2 DATA REPORTING

The project laboratory will report the data in a certificate of analysis format. Sample analytical results and accompanying QA/QC sample results can then be transferred to computer diskette files suitable for transfer to the spreadsheet data base.

Analytical data will be identified according to the project laboratory's procedures for establishing sample lots, so that sample analysis data can be matched to corresponding QA/QC samples, control charts, and calibration data.

8.3 GENERAL PROCEDURES FOR DATA REVIEW/VALIDATION

8.3.1 Field Data

Level I data (e.g., screening for VOCs) will be validated by reviewing calibration and maintenance records for field instruments and field logbook information associated with individual data sets to ensure that appropriate SOPs were followed. Data validation, therefore, will be qualitative, and will focus on whether field screening data are of acceptable quality based upon supporting documentation. Acceptance or rejection of data will be determined by the judgment of experienced field personnel familiar with the SOPs.

8.3.2 Laboratory Data

Generation of the off-site laboratory data will include the analysis of QA/QC samples, including blanks, calibration and reference standards, and possibly spiked samples in some instances; however, a complete CLP QA/QC analysis program will not be performed for these samples. Items that will be reviewed to validate the data include:

1. Integrity and completeness of the data package,
2. Holding times from sample receipt at the laboratory to sample extraction and analysis or holding times from sample receipt to analysis, as appropriate,
3. Trip blank and laboratory method blank sample results,
4. Matrix spike, matrix spike duplicate, and replicate analyses,
5. Surrogate recoveries,
6. Field blank sample results, and
7. Field duplicate results.

Data validation will be a qualitative process. Review of precision, accuracy, representativeness, completeness and comparability criteria will be included whenever measurement data are reviewed. The analytical laboratory will provide numerical precision and accuracy data that will be compared to the acceptance criteria. Precision and accuracy values for project data sets that are within the ranges for the type of sample and analytical method used will be considered acceptable. In some cases, data of apparently poor precision and/or accuracy may be somewhat useful. The judgment to accept such data, with appropriate qualifications, will be made by a data validator with appropriate technical expertise.

9.0 CORRECTIVE ACTION

Corrective actions may be required anytime an out of control situation occurs. This type of situation can occur in either the field/sampling or the laboratory and may adversely effect data quality or quantity. Each of these areas is addressed below. All corrective actions will be noted and the notation will be provided to the appropriate OHM and/or client management.

9.1 FIELD/SAMPLING

Field/sampling situations which may require corrective actions include, but are not limited to:

1. Unavailability of predetermined sample locations
2. Improperly packaged samples
3. Mislabeled samples
4. FSQAP execution deficiencies

These situations will be corrected through discussions with the sampler, Project Chemist, Project Manager and laboratory, if required. If necessary, the client representative will also be notified. Part of the corrective action will be to ensure that procedures are written/amended to alleviate the problem, if possible. Corrective actions will be implemented at the lowest possible management level to speed resolution.

9.2 LABORATORY

No analytical corrective actions will be performed by OHM. Laboratory corrective action(s) may be required if:

1. Any QC data is outside of the acceptable limits for precision and accuracy as defined in the laboratory QA Plan.

2. Any blanks or laboratory control samples contain contaminants above acceptable limits.

3. Undesirable trends are detected in spike and/or surrogate recoveries, or duplicate sample RPD.

4. There are unusual changes in the method detection limits.

5. Deficiencies are detected by the QA department during internal or external audits or from the results of performance evaluation samples.

6. Inquiries concerning data quality are received from the Contracting Officer.

9.2.1 Corrective Action Procedures

Corrective action procedures for out of control events in the following areas are found in the contract laboratories Quality Assurance Plan.

1. Incoming samples
2. Sample holding times
3. Instrument calibrations
4. Practical quantitation limits
5. Method QC
6. Calculation errors
7. Laboratory audits

9.2.1.1 Short Term Corrective Actions

Short term corrective actions are initiated and performed by the analyst during sample analysis procedures. These corrective actions are necessary for analyses to be completed successfully. Examples of the situations requiring corrective actions are listed below:

- Instrument performance does not meet acceptable criteria
- Standard degradation/volatilization during storage
- Calibration check standard results outside of acceptable range
- Contamination identified in blanks, QC samples or the instrument
- Quality Control data is outside of acceptable limits

9.2.1.2 Long Term Corrective Actions

Long term corrective actions may be initiated to correct repetitive problems, unusual occurrences or trends, or as a result of internal/external audits. A long term corrective action will include some/all of the following points, depending upon the type of irregularity:

- Review of relevant data
- Evaluation of detection limit(s)
- Standards validation
- Instrument and equipment performance
- Reanalysis of sample
- Contamination and matrix interference effects
- Training
- Operating procedure review/revision.

9.2.1.3 Other Causes for Corrective Actions

- Client identified errors in analysis/reporting
- Data review corrective actions - Errors, deviations and omissions from standard laboratory protocols identified during a review for QC data quality and compliance with overall quality objectives may result in corrective action(s).
- Client recommended corrective actions